CLAIMS

1. A system comprising:

a network server, to provide media content on request through a wireline network;

a wireless host, to request media content through a wireless network; and

a network gateway, coupled to each of the server and the wireless host, to establish a communication channel from the server to the wireless host through both the wireline network and the wireless network, wherein the communication channel includes a transport layer protocol with control parameters for each of the wireline network and the wireless network.

2. A system according to claim 1, wherein the transport layer protocol of the communication channel enables the network gateway to distinguish transmission problems occurring within either network component of the communication channel.

3. A system according to claim 1, wherein the network server comprising:

a transmission rate controller to receive media content from an application and control transmission over the wireline network; and

a congestion controller , to receive congestion control indications from the network gateway in the transport protocol, estimate the available bandwidth over the network, and to instruct the transmission rate controller to adjust the transmission rate accordingly.

4. A system according to claim 1, the network server further comprising:

an application error control interface, to receive a bit-error rate (BER) control parameter from the network gateway via the transport protocol denoting the bit-error rate (BER) experienced at the wireless host; and

a partial checksum generator, responsive to the application error control interface, to generate checksum of a dynamically selected amount of the requested content for inclusion in at least a subset of transmitted frames for error control purposes based, at least in part, on the received BER control parameter.

5. A system according to claim 4, wherein the partial checksum generator includes more data in the partial checksum when the BER increases, less data when the BER decreases.

6. A system according to claim 1, the wireless host comprising:

a fading timeout monitor, to identify degradation in transmission quality in the wireless network component resulting from fading and/or multipath conditions, and to issue a fading condition control parameter to the network gateway via the transport layer protocol.

7. A system according to claim 6, wherein the fading condition control parameter includes an indication to the network gateway of what frame to commence retransmission of content lost due to fading and/or multipath.

8. A system according to claim 1, the wireless host comprising:

a header analyzer, to analyze at least a partial checksum in a header of a received frame of media content to determine whether an accurate frame was received; and

a bit-error rate (BER) controller, coupled to the header analyzer, to generate a BER control parameter for the network gateway via the transport layer protocol denoting a running average of accurately received frames.

9. A system according to claim 1, the network gateway comprising:

a congestion monitor, to monitor congestion of the communication channel, and to issue a congestion control parameter to the network server via the transport layer protocol.

10. A system according to claim 1, the network gateway comprising:

a buffer, to receive frames of media content from the network server via the wireline network component of the communication channel, and to selectively provide frames of the received media content to the wireless host via the wireless network component of the communication channel.

11. A system according to claim 10, the network gateway further comprising:

a weighted scheduling module, coupled to the buffer, to schedule delivery of media content from the buffer to the wireless host based on their priority.

12. A system according to claim 10, the network gateway further comprising:

one or more retransmission modules, coupled to the buffer, to receive one or more of a negative acknowledgment (NACK) control parameter and/or a fading control parameter and determine whether the requested retransmission of one or more frames can be accommodated.

13. A system according to claim 12, wherein the one or more retransmission modules determine whether the requested retransmission may occur by determining whether a start frame, identified within the received control parameter, is available within the buffer.

14. A system according to claim 1, wherein the transport layer protocol comprises:

a congestion control parameter, generated by the network gateway in response to congestion detected along the communication channel.

15. A system according to claim 14, wherein the congestion control parameter is sent to the server for purposes of throttling transmission of the media content.

16. A system according to claim 1, wherein the transport layer protocol comprises:

a fading control parameter, generated by a wireless host to provide an indication to the network gateway that the wireless host has just concluded a period of fading.

17. A system according to claim 16, wherein the network gateway retransmits one or more frames of media content commencing at a frame denoted by a received fading control parameter.

18. A system according to claim 1, wherein the transport layer protocol comprises:

a negative acknowledgment (NACK) control parameter, generated by the wireless host to denote one or more frames of media content received with an unacceptably high bit-error rate (BER).

19. A method comprising:

receiving a request from a wireless host for content available from a network server;

establishing a communication channel to service the request between the wireless host and the network server over a wireless network and a wireline network coupled to the server; and

adjusting transmission characteristics in one or more of the wireline network and/or the wireless network to improve transmission quality based, at least in part, on one or more control parameters of a transport layer protocol of the communication channel which distinguish wireline transmission problems from wireless transmission problems.

20. A method according to claim 19, wherein the transport layer protocol includes a control parameter to denote congestion in the communication channel.

21. A method according to claim 20, further comprising:

instructing a server of the requested content to reduce transmission rate to alleviate congestion identified in the wired network component in response to receiving a congestion control parameter.

22. A method according to claim 19, wherein the transport layer protocol includes a control parameter to denote a fading condition in a wireless network component of the communication channel.

23. A method according to claim 22, further comprising:

calculating a delay measure when a fading condition control parameter is received; and

retransmitting content from a buffer to the wireless host starting at a frame denoted by the fading condition control parameter if the delay measure does not exceed a threshold.

24. A method according to claim 23, wherein calculating the delay measure comprises:

identifying the start time of the frame denoted in the fading condition control parameter; and

subtracting the start time from the current project time to quantitatively measure what kind of delay would be incurred by retransmitting frames lost during the fading condition.

25. A method according to claim 19, wherein the transport layer protocol includes a negative acknowledgment (NACK) control parameter to denote that a frame was dropped due to a high bit-error rate (BER) condition.

26. A method according to claim 25, further comprising:

identifying whether the frame denoted in the NACK control parameter is still available in a buffer of received media content;

calculating a delay measure when a NACK control parameter is received; and

retransmitting the frame from the buffer to the wireless host if it is identified within the buffer;

the delay measure not exceeding a threshold.

27. A method according to claim 25, wherein calculating the delay measure comprises:

identifying the start time of the frame denoted in the NACK control parameter; and

subtracting the start time from the current project time to quantitatively measure what kind of delay would be incurred by retransmitting the lost frames.

28. A computer-readable medium having computer-executable instructions that, when executed by a computer, performs the method as recited in claim 19.

29. A computer comprising one or more computer-readable media having computer-executable instructions that, when executed by the computer, perform the method as recited in claim 19.

30. A transport layer protocol to facilitate streaming of media content across heterogeneous networks, the protocol comprising:

a congestion parameter, which provides a receiving network element with an measure of congestion incurred in transmission within the network;

a fading parameter which, when asserted, provides a receiving network element with an indication that a communicatively coupled wireless host just emerged from a fading condition; and

a BER parameter, which provides a receiving network element with an measure of bit error rate incurred in transmission within a wireless network.

31. A computer comprising a sender of the protocol as recited in claim 30.

32. A computer comprising a receiver of the protocol as recited in claim 30.

33. A transport layer protocol to facilitate streaming of media content across heterogeneous networks, the protocol generated in accordance with the following acts:

providing a server computer in a communications with a communications network;

receiving data using the protocol by way of the communications network, the protocol comprising:

a congestion parameter, which provides a receiving network element with an measure of congestion incurred in transmission within the network;

a fading parameter which, when asserted, provides a receiving network element with an indication that a communicatively coupled wireless host just emerged from a fading condition; and

a BER parameter, which provides a receiving network element with an measure of bit error rate incurred in transmission within a wireless network.